



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

alimentary cavity, and it must be admitted to be possible that a primitive gregariniform parasite might become multicellular and might develop reproductive and other organs, without finding any advantage in an alimentary canal. A purely objective classification will recognize both these possibilities and leave the question open.

THE SONG OF THE CICADA.

BY F. C. CLARK, M. D.

It must not be considered that all music is a succession of delightful sounds. Harmony, it is true, depends much upon the construction of the musical apparatus, but it depends still more upon the skill of the operator and the taste of the listener. Hence among the lowest insect tribes, many a rough, rasping note, though awakening no particular delight in us, serves as great a purpose as the more pleasant sounds.

On any warm sunny afternoon, or evening, insect courtships take place in countless numbers under our very eyes if we would only use them. What *Katy-did*, which name the insect has borne for ages, still exercises the imagination of poets and philosophers. We hear it loudly whispered in trees and shrubbery, that something was done by "Katy," but beyond that we are left in utter darkness; though some poets have even attempted to unravel the mystery.

Among still higher orders of animals, as our birds, we find the plumage of the male more brilliant, during the pairing season, and their songs more ravishing than before. At this time they charm the human listener, even as much as the delighted female bird. Even our barn-yard cock, good chanticleer, assumes a bolder front, and echoes his joyous notes over hill and dale.

Rising to mammals, man excepted, we shall observe certain sounds more or less pleasant, but still sufficient to fulfil the object for which they were created.

Therefore from the human family, where music reaches its highest perfection, down to the lowest and meanest insect that utters a sound, each furnishes notes to form the grand harmony of nature, in the great struggle for existence. To a cultivated

ear, the peep of a frog, or the chirp of a cricket, is not less unpleasant than the monotonous humdrum of the savage, who represents now the place formerly occupied by the most cultivated nations of the world.

The cicada (or harvest-fly), improperly called "locust," is so familiar that its description seems hardly necessary. Suffice it to say, that from the middle of June to early autumn, this joyous little songster is heard piping away upon the trees.

The insects especially known to us are the trumpeter (*Cicada tibicen*) or lyreman, as it is known in Surinam, from its noise resembling the notes of a lyre, and the red-eyed cicada, or seventeen-year locust (*C. septendecim*). There is a third (*C. canicularis*) which appears during dog-days only. Its inferior aspect is covered with a substance resembling meal.

The lyreman comes to us in a garb of green, and with wings trimmed with the same color. The red-eyed cicada is clothed in red as the lyreman is in green. This last insect has been thought only to appear as its name indicates. But though less numerous than the trumpeter, the red-eyed locusts may be found during every year, though in different regions of our country, its name to the contrary notwithstanding.

But it is the cicada's song, which chiefly interests us now—its "noise" if you will have it so. In some countries where the harvest-fly abounds (for all species of it sing in the same way) its strident noise is in some instances almost deafening, and may be heard a mile off. But our cicada, I am happy to say, is not so annoying.

The males alone are provided with the musical apparatus. This fact led a very satirical Greek, Zenarchos by name, to exclaim, I fear, not in a very gallant manner :

"Are not cicadas truly blest
By not a female voice oppressed."

The ancients speak of them in the most flattering terms. So much did they please our Greek and Roman friends, that they were kept in cages, as one would pet a bird.

The Athenian ladies wore gold cicadas in their hair as ornaments. A toy cicada, sitting upon a harp, was an emblem of the science of music.

But the cicada was not alone beloved for its song. They were also served up as dainty morsels to Athenian epicures. A shrewd

old philosopher remarked, that cicadas were good in the pupa state, but better when served up full grown, especially the females, just before they have deposited their eggs.

From historians and philosophers we pass to the poets. Their praises and similes here are legion. Homer compares garrulous old men ;

“ To the cicadas, which infest
The woodlands, and sitting upon the trees
Utter a delicate voice.”¹

And Virgil,

“ And shrill cicadæ all the woodland tire ” (Southey).²

which leaves it apparent to our minds, that their music did not strike our poet as being very melodious.

Since we hear the cicada generally during the hottest part of the day, Virgil says again :

“ Under a scorching sun the woods resound
With shrill cicadas’ notes.”³

In fine, no praises seemed too extravagant to lavish upon the harvest-fly. The ancients called them “ the love of the Muses,” “ Sweet prophet of summer,” etc. They likened them to the gods. No sound seemed to awaken in their minds memories so pleasant, as the truly delicate voice of the cicada. We can, perhaps, sympathize with them here, when we hear the peeping of the frogs at the opening of spring, the glad token that the long and cold winter is past. Especially can we feel such emotions when we hear them after a long absence from home.

Antipater is said to have preferred the notes of the cicada to the swan’s. But all others’ praises fall short, compared with what Anacreon bestows upon our little friend. And truly most rapturously he sings

“ Oh thou of all creation blest,
Sweet insect! that delight’st to rest
Upon the wild wood’s leafy tops,
To drink the dew that morning drops,
And chirp thy song with such a glee,
That happiest kings may envy thee!
Whatever decks the velvet field,
Whate’er the circling seasons yield,
Whatever buds, whatever blows,
For thee it buds, for thee it grows.
Nor yet art thou the peasant’s fear,
To him thy friendly notes are dear;
For thou art mild as matin dew,

¹ IL, Book III.

² Geog. III, 328.

³ Bucol. II.

And still, when summer's flowery hue
 Begins to paint the bloomy plain,
 We hear thy sweet prophetic strain;
 Thy sweet prophetic strain we hear,
 And bless the notes, and thee reverent!
 The Muses love thy shrilly tone;
 Apollo calls thee all his own;
 'Twas he who gave that voice to thee,
 'Tis he who tunes thy minstrelsy.
 Unworn by ages' dim decline,
 The fadeless blooms of youth are thine.
 Melodious insect! child of earth!
 In wisdom mirthful, wise in mirth:
 Exempt from every weak decay,
 That withers vulgar minds away;
 With not a drop of blood to stain,
 The current of thy purer vein,
 So blest an age is passed by thee.
 Thou seem'st a little deity."⁴

Now after singing the praises of our little friend, the cicada, in not, I hope, too extravagant a vein, we pass to a brief description of his singing apparatus, and learn how he makes his music, and see how wonderful and complicated that organ really is.

Réaumur made numerous dissections of the cicada, and was the first to describe accurately the mode of production of its music. But as these dissections can easily be made, and the insects plenty, each one may investigate quite well for himself. A careful examination of the insect is however necessary, as the whole musical apparatus is within the abdomen in the first ring.

Upon the abdomen of the male, are seen two close fitting scales, rounded at the free end, and straight where they join the body. These can be lifted to a considerable degree, but prevented to too great an extent by two projections which serve to keep the valves (or opercula more properly) in place. Removing the valve, we observe beneath a cell, a little box, so to say, at the bottom of which lies a circular membrane of exceeding thinness, and presenting all the colors of the rainbow. Réaumur calls it the mirror. It resembles the drum of the ear, and affords much pleasure even in a cursory examination. Imagine for the time two cells, with each a window opening into the internal parts of the body, and concealing machinery which works the apparatus. Each cell is divided into three parts by a triangular plate; the upper boundary being a semilunar membrane, which may be con-

⁴Ode XXXIV, Moore's Trans.

tracted or relaxed at the pleasure of the insect, and the part containing the mirror. But the real organ is only seen from the back. It is found a little below the external covering of the animal, directly facing the membranous drumhead in the first cavity. It consists of a very thin membrane, wrinkled, and can be moved back and forth within its circumference, causing a snapping noise, something like the sounds given out by the live insect. Attached beneath each drumhead are fibres of muscle, which join near the inside edge of the mirrors, and form one, which is inserted to the back. If we pull one, or both these muscles, the well known sound is emitted. When these muscles are contracted or pulled, the drumhead falls in; and when relaxed, the drumhead springs into position by its own elasticity. We can therefore imagine how, when these muscles are contracted with sufficient rapidity, the insect sings his song. The musical instrument is therefore, simply a little drum. The sound passes through the first cell, and its pitch is regulated by the movable semilunar membrane. Then striking against the mirror the sound may be reinforced; and then passes out by the valves which regulate its intensity in some manner. For on pressing the valves closely to the body, little sound, if any, is emitted; raise up the valves as high as possible and the sound is most intense.

The insect may be kept captive for some time, and in this condition much may be learned from actual observation. Boys in Surinam fasten straws to the cicadas and run with them through the streets. Its "noise" has been compared to the sound given out by whirling a piece of cardboard attached to a string, rapidly through the air.

The cicada, though as in the seventeen-year species maturing for several years, lives but for a brief season. With the expiring summer he takes his leave, and testifies with his lingering life, a glad song which grows feebler and feebler, till finally it dies away sadly but beautiful like the summer he carries with him.